graphical investigation. It would seem however that these properties are not well known, since just recently the theorem (11) has been proposed for proof in as serious a journal as the *Nouvelles Annales de Mathématiques*.[1]

It is noteworthy that the sides of the rectangle (11) are proved by Prof. Neuberg to be parallel to the bisectors of the angles formed by the diagonals of the quadrilateral; V. Thébault states that these sides are equally inclined on the sides of the given quadrilateral, while in my paper they are shown to be parallel to the lines joining the mid-points of the arcs subtended by the opposite sides of the given quadrilateral on its circumcircle (compare sections 10, 11). Prof. Clawson adds that they are parallel to the bisectors of the angles formed by any pair of opposite sides of the given quadrilateral.

Thus comes to light an interesting and rather involved property of the inscriptible quadrilateral, worthy perhaps of a direct proof.

BOOK NOTICES.

Edited by W. H. Bussey, University of Minnesota.

A circular advertising the new book on *Unified Mathematics* by Karpinski, Benedict and Calhoun says that "particular attention is paid to problems dealing with projectiles, and the 'mil,' the artillery unit of angular measurement, is carefully explained." But the reader will look in vain for the word "mil" in the index of the book; and he will look in vain in the paragraphs on angles and angular measurement where the degree and radian are defined. However if he is bound to know what a "mil" is and searches further he will be rewarded when he finds Ex. 11 on page 114 which reads: "In the artillery service angles are measured in 'mils'; a 'mil' is defined as 1/6,400 of a complete revolution. Compute the value in radians of one mil." Of course all this is in no sense a real criticism of the book, which was not written primarily for men of the S. A. T. C. The book contains 522 pages. It is supposed to be a course in elementary mathematics adapted to the needs of the freshmen students in the ordinary college or technical school course. According to the preface the material includes the work commonly covered in the past in separate courses in college algebra, trigonometry and analytical geometry. But there is no chapter on Permutations, Combinations and the more simple elements of Probability, and there is no mention of these topics in the index. As one might expect from the fact that Prof. Karpinski is known to be interested in the history of mathematics, the book abounds in historical notes and references. The book is published by D. C. Heath and Co.

Unified mathematics seems to be making its way. In addition to the book just mentioned, several other books on correlated mathematics have recently been published or are about to be published.

[1] V. Thébault, *N. A. M.*, August, 1917, p. 319.

The McGraw-Hill Book Co. has published a new and revised edition of the well known *Elementary Mathematical Analysis* written by Professor CHARLES S. SLICHTER of the University of Wisconsin.

Another unified mathematics book is *Freshmen Mathematics* by Professor WILLIAM R. RANSOM, of Tufts College, published by Longmans, Green and Co. It is a book of 285 pages, much less extensive than the two books just mentioned. "The chief features of the book are its brevity, the breadth and simplicity of its methods, its selection of subject matter for utility and interest rather than for mathematical completeness, and the careful preparation of problem material." Among other novel features it contains a short chapter entitled "Trigonometry in three dimensions" which begins with an explanation of the theory of the sun-dial and ends with longitude problems.

Ginn and Company have just published an *Introduction to the Elementary Functions* by R. B. McCLENON and WILLIAM J. RUSK, of Grinnell College. It is an attempt to solve the problem of the first year collegiate course in mathematics. The idea of functionality is the unifying principle. The last chapter is a 28 page introduction to the differential calculus. There is no work on integral calculus, although the authors "firmly believe that this topic should eventually be included in the first year course."

Ginn and Co. are about to publish a book called *General Mathematics*, by Mr. RALEIGH SCHORLING, of the Lincoln School, Teachers' College, Columbia University, and Mr. W. D. REEVE, of the University High School, University of Minnesota. It is the first of a series of four volumes on mathematics for high school students. The first volume is for first year high school students.

At the annual meeting of the Association in December, 1917, many mathematicians who had never studied descriptive geometry were awakened to an interest in the subject by Professor Roever's paper on descriptive geometry. Those who have not yet followed that inspiration to study the subject may be interested in the fifth edition of *Descriptive Geometry* by W. L. AMES and CARL WISCHMEYER, of Rose Polytechnic Institute, recently published by the McGraw-Hill Book Company. It is a small book of 112 pages.

There has recently been issued by the Bureau of Education at Washington a Bulletin on *The Training of Teachers of Mathematics for the Secondary Schools of the Countries Represented in the International Commission on the Teaching of Mathematics*. This Bulletin has been prepared by Professor R. C. ARCHIBALD, of Brown University. It is a work of nearly three hundred pages, giving in great detail the requirements set by the various governments for a teacher of secondary mathematics. The Bureau of Education has a limited number of copies of this Bulletin which it can send to those who are particularly interested in the work. After this limited number has been exhausted, copies can be obtained from the Superintendent of Documents, Government Printing Office at Washington, D. C., at 30 cents per copy.

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QUESTIONS AND DISCUSSIONS.

Edited by U. G. Mitchell, University of Kansas, Lawrence.

Three questions which, among others, have been standing for some time without having been answered are republished below in the hope that some of our readers may thereby be stimulated to send in suitable replies.

15. In the *Proceedings of the Royal Society of Edinburgh*, Vol. VII, p. 144, in some mathematical notes by Professor P. G. Tait, it is stated:

"If $x^3 + y^3 = z^3$, then $(x^3 + z^3)^3y^3 + (x^3 - y^3)^3z^3 = (z^3 + y^3)^3x^3$.

"This furnishes an easy proof of the impossibility of finding two integers the sum of whose cubes is a cube."

How does this "easy proof" follow?

(A partial reply to the above has been received showing that if $x^3 + y^3 = z^3$, then $(x^3 + z^3)^3y^3 + (x^3 - y^3)^3z^3 = (z^3 + y^3)^3x^3$. Can some one show how the "easy proof" then follows?)

21. For the diophantine equation

$$x^2 - y^3 = 17$$

there are known the following solutions:

$$\begin{array}{lrrrrrrrr} x = & 3, & 4, & 5, & 9, & 23, & 282, & 375, & 378661, \\ y = & -2, & -1, & 2, & 4, & 8, & 43, & 52, & 5234. \end{array}$$

One of our readers, who supplied the foregoing facts, desires to know the answers to the following questions: Are there other solutions of the given diophantine equation? How may all the solutions of this equation be found by a systematic procedure?

32. In a discussion of the Peaucellier[1] Cell by analytic methods the following equations are obtained:

$$\begin{array}{llll} (1) & (x_2 - x_1)^2 + (y_2 - y_1)^2 - b^2 = 0; & (2) & (x_3 - x_1)^2 + (y_3 - y_1)^2 - b^2 = 0; \\ (3) & (x_2 - X)^2 + (y_2 - Y)^2 - b^2 = 0; & (4) & (x_3 - X)^2 + (y_3 - Y)^2 - b^2 = 0; \\ (5) & x_2^2 + y_2^2 - K^2 = 0; & (6) & x_3^2 + y_3^2 - K^2 = 0; \end{array}$$

$$(7) \quad x_1^2 + y_1^2 - 2cx_1 = 0.$$

The result of eliminating x_1, y_1, x_2, y_2, x_3, y_3 gives an equation of the first degree, which establishes that the linkage will trace a straight line. There are various ways of effecting this elimination.

1. What element of the situation is left unused by the following procedure in the elimination?
   (*a*) From equations (1), (3), (5) eliminate x_2 and y_2 and obtain an equation
   $$(8) \quad f_1(x_1, y_1) = 0.$$
   (*b*) From equations (2), (4), (6) eliminate x_3 and y_3 and obtain an equation
   $$(9) \quad f_2(x_1, y_1) = 0.$$
   (*c*) From equations (7), (8), (9) eliminate x_1 and y_1 and obtain the desired equation.
2. How should this procedure be supplemented to secure the result?

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[1] If reference is made to the article on "Linkages" in the December, 1915, Monthly, by Mr. Leavens, the following coördinates may be applied to his figure: $O(0, 0)$; $C(c, 0)$; $P_1(x_1, y_1)$; $M(x_2, y_2)$; $M_1(x_3, y_3)$; $P_2(X, Y)$.